CLAIMS

1. An analysis apparatus, in which a specimen containing cells is applied onto a disc, light is emitted to the disc, and the number of cells is determined based on reflected or transmitted light, the analysis apparatus comprising:

a one-dimensional cell recognition section for one-dimensionally recognizing the cell based on a change of the reflected or transmitted light,

a specimen memory for storing first data in a bit corresponding to each track of the disc based on a recognition result of the one-dimensional cell recognition section, the first data indicating presence or absence of the cell,

a two-dimensional cell recognition section for two-dimensionally recognizing the cell by scanning the specimen memory with a window having a given size to confirm the first data,

a data addition section for adding second data to the specimen memory for each window, the second data indicating presence or absence of the cell in the two-dimensional cell recognition,

a cell size identification section for identifying a cell size by using the second data, and

a window movement control section for controlling movement of the window,

wherein the second data indicating the presence or absence of the cell for each window is added to the specimen memory, so that a cell size and the number of cells are obtained with one data acquisition.

2. An analysis apparatus, in which a specimen containing cells is applied onto a disc, light is emitted to the disc, and the number of cells is determined based on reflected or transmitted light, the analysis apparatus comprising:

a one-dimensional cell recognition section for one-dimensionally recognizing the cell based on a change of the reflected or transmitted light,

a specimen memory for storing first data in a bit corresponding to each track of the disc based on a recognition result of the one-dimensional cell recognition section, the first data indicating presence or absence of the cell,

a two-dimensional cell recognition section for two-dimensionally recognizing the cell by scanning the specimen memory with a window having a given size to confirm the first data,

a window switching section for arbitrarily switching a size of the window during scanning of the specimen memory,

a cell size identification section for identifying a cell size recognized from a scanning result obtained with one or more window sizes in the two-dimensional cell recognition section, and

a data deletion section for deleting the first data after identification in the cell size identification,

wherein when a cell is confirmed during scanning of the specimen memory, a cell size is identified by changing the window size and performing rescanning, so that a cell size and the number of cells are obtained with one data acquisition.

3. The analysis apparatus according to claim 1 or 2, wherein a sampling period can be changed with the size of the cell in the specimen.

4. The analysis apparatus according to claim 1, further comprising a cell spacing memory for storing a spacing between the cells during scanning of the specimen memory with the window, and a memory skip control section for scanning only an area having the cell based on information from the cell spacing memory when the window size is switched to rescan the specimen memory.

5. A cell counting method in an analysis apparatus, the method comprising:

reading a data array in an area of a scanning window from memory for storing the data array having binary data of "0" or "1" surface-aligned along a lateral direction X and a longitudinal direction Y, the binary data being obtained based on presence or absence of cells applied with two or more sizes on an analysis disc, the scanning window movable in the lateral direction X and the longitudinal direction Y and having a size expressed by rows × X, the rows being aligned along the X direction of the data array,

performing an operation based on the data to decide the presence or absence of the cells,

identifying cell sizes, and

counting the number of the cells for each of the cell sizes,

wherein the scanning window is constituted of a first window for deciding whether "0" is present over an area of the first window with a size of 1 × X1 (X1 is an integer constant), a second window for deciding whether "1" is included in an area of the second window positioned with a size of 1 × 1 at a center of the X direction of the first window in a subsequent row of the first window, and a third window for deciding whether at least one "1" is included in each row of an area of the third window positioned with a size of Y × X1 (Y is an integer variable) in a subsequent row of the second window, and the cell sizes are identified using the scanning window.

6. The cell counting method in the analysis apparatus according to claim 5, wherein X1 is larger than a range of displacement caused by variations in a sampling starting point.

7. The cell counting method in the analysis apparatus according to claim 5 or 6, wherein the size of the cell to be detected is set at Y2 to Y3 (Y2 and Y3 are integers, Y2

< Y3), reading of the data array in the area of the scanning window is started with the scanning window where Y = Y2 - 1 is established, Y is changed, when there is a match with a condition of the scanning window, successively to Y2, Y2 +1, … on a position where there is the match, and it is decided whether there is a match with the range condition of Y whereby the data array in the area is read until there is no match or Y = Y3 is obtained.

8. The cell counting method in the analysis apparatus according to any one of claims 5 to 7, wherein presence or absence of the cell is decided according to a change in light quantity when laser light is emitted to a track on the analysis disc where the cell is applied and when the laser light is received by a photodetector.

9. A cell counting method in an analysis apparatus, the method comprising:

reading a data array in an area of a scanning window from memory for storing the data array having binary data of "0" or "1" surface-aligned along a lateral direction X and a longitudinal direction Y, the binary data being obtained based on presence or absence of cells applied with two or more sizes on an analysis disc, the scanning window movable in the lateral direction X and the longitudinal direction Y and having a size expressed by rows × X, the rows being aligned along the X direction of the data array,

deciding the presence or absence of the cells based on the data,

identifying the sizes of the cells, and

counting the number of the cells for each cell size,

wherein the scanning window is constituted of a first window for deciding whether "0" is present over an area of the first window with a size of 1 × X1 (X1 is an integer constant), a second window for deciding whether "1" is included in an area

of the second window positioned with a size of 1 × 1 at a center of the X direction of the first window in a subsequent row of the first window, a third window for deciding whether at least one "1" is included in each row of an area of the third window positioned with a size of Y1 × X1 (Y1 is an integer variable) in a subsequent row of the second window, and a fourth window for deciding whether "0" is present over an area of the fourth window positioned with a size of 1 × X1 (X1 is an integer variable) in a subsequent row of the third window, and the cell sizes are identified using the scanning window.

10. The cell counting method in the analysis apparatus according to claim 9, wherein X1 is larger than a range of displacement caused by variations in a sampling starting point.

11. The cell counting method in the analysis apparatus according to claim 9 or 10, wherein the presence or absence of the cell is decided according to a change in light quantity when laser light is emitted to tracks on the analysis disc where the cell is applied and when the laser light is received by a photodetector.

12. An analysis apparatus, in which detection light is emitted to an analysis disc where cells are applied, and the cells are counted based on data received by a photodetector, the analysis apparatus comprising:

a memory for storing binary cell information for each bit of a data bus, the cell information being obtained for each track on the analysis disc,

a window movable in an area of the memory,

a window movement control section for controlling a movement of the window,

a cell size determination section for recognizing the cell from an array of "1" in the window and determining a cell size,

a cell counting section for incrementing a counter after recognition of the cell, and

a memory rewriting section for rewriting "1" to "0" after the recognition of the cell.

13. The analysis apparatus according to claim 12, wherein the window movement control section comprises a window scanning section for causing a window with a size of 1 × 1 to scan in an address direction, a "1" decision section for deciding presence or absence of "1" during scanning of the window, a cell size counter for incrementing a count every time the decision section detects "1", a window control section for expanding the window to "1" detected by the decision section, a stage shifting section for shifting a scanning segment of "1" in a bit direction every time the decision section detects "1", and a search segment control section for limiting a range where the window is caused to scan in the shifted scanning segment.

14. The analysis apparatus according to claim 12 or 13, wherein a size expanded in the address direction is determined based on a desired cell size and the obtained size is used as a search segment of a subsequent bit.

15. A cell counting method in an analysis apparatus, in which detection light is emitted to an analysis disc where cells are applied, and the cells are counted based on data received by a photodetector, the method comprising:

step 1 of causing a window with a size of 1 × 1 to scan in an address direction and detecting "1" in a memory area,

step 2 of expanding the window to 1 × X6 (X6 is an integer constant) relative to the detected "1",

step 3 of disposing the window of 1 × X6 in a subsequent stage and expanding, when the window has "1", the window to the subsequent stage,

step 4 of repeating processing of step 2 and step 3 until no "1" is detected in the window,

step 5 of ending expansion of the window when no "1" is detected in the window, and making a count when the window has a size of a predetermined value in a Y direction, and

step 6 of rewriting all "1" to "0" and repeating processing from step 1.